European Review for Medical and Pharmacological Sciences 2012; 16: 1947-1950

Solitary sternal metastasis of nasopharyngeal carcinoma: a case report

T. AKBAS, G. UGURLUER**, T. ARPACI*

Department of Radiology, Acibadem University, Istanbul, Turkey
*Department of Radiology, Adana Acibadem Hospital, Turkey
**Department of Radiation Oncology, Acibadem University, Istanbul, Turkey

Abstract. – Solitary sternal metastasis of nasopharyngeal carcinoma (NPC) is rare. At the time of diagnosis, distant metastases are found in about 5 to 7% of NPC patients. We report a case of isolated sternal metastasis of nasopharyngeal carcinoma in a 23 year-old man.

Key Words:
Nasopharyngeal carcinoma, Metastasis solitary, Sternum.

Introduction

Locally advanced nasopharyngeal carcinoma (NPC) has a poor prognosis with a propensity to develop metastases at a high rate. The most common sites of distant metastases are bones, liver, and lungs. Metastatic sides are usually multifocal[1-3].

For nasopharyngeal cancers, sternal metastases are infrequently encountered[4].

In this report, we present a case of isolated solitary sternal metastasis of nasopharyngeal carcinoma in a 23 year-old man at the time of diagnosis.

Case Report

A 23 year old male patient complained of tinnitus, ache and hearing loss of left ear for 8 months prior to being diagnosed. He had received medical treatment for serous otitis media but the symptoms persisted. He was referred to the Ear Nose Throat Clinic. On physical examination, he was found to have bilateral cervical lymphadenopathy. Endoscopic examination was performed, and it revealed a nasopharyngeal mass lesion. Computed tomography (CT) showed a mass filling the nasopharynx and invading the clivus with loss of anterior cortical margin (T3). The patient underwent magnetic resonance imaging (MRI) scan of the head and neck which showed an extension of the tumor into the left parapharyngeal space and left nasal cavity. Intracranial extension was not detected (Figure 1). Bilateral enlarged cervical lymph nodes were found at about 2.5 × 2 cm in the right level II and 1.5 × 1 cm in the left level III (N2). Supraclavicular lymph nodes were not seen. Biopsy was done, and histopathological examination revealed an undifferentiated, non-keratinizing carcinoma of the nasopharynx (WHO type III).

The patient was referred to the Department of Radiation Oncology for radiation therapy. Whole-body 18 fluorodeoxyglucose positron emission tomography (18F-FDG 18F-FDG PET/CT) scan was performed for staging and radiation treatment planning. 18F-FDG PET/CT revealed a highly FDG avid soft tissue mass lesion approximately 38 × 16 mm in size in left parapharyngeal space (SUV max, standardized uptake value was 12.10), left and right cervical lymph nodes (SUV max 13.50) and focal increased FDG involvement in the corpus sterni. MRI examination was performed for detailed evaluation of sternal lesion. Expansile, 3.5 × 3 cm sized, mild enhanced, lytic lesion was seen in the corpus sterni (Figure 2). According to the American Joint Committee on Cancer Staging System, he was staged as T3N2M1 stage IV. The patient was referred to the Medical Oncology Clinic for further evaluation.

Discussion

The history of the patient with NPC should be evaluated carefully. The otological manifestations of nasopharyngeal cancer are otitis media with effusion, conductive hearing loss and otalgia which are usually unilateral. A high index of suspicion is, therefore, needed to evaluate adult patients with unilateral serous otitis media or Eustachian tube dysfunction for possible nasopharyngeal cancer[5,6].

Corresponding Author: Tugana Akbas, MD; e-mail: tbakbas@yahoo.com

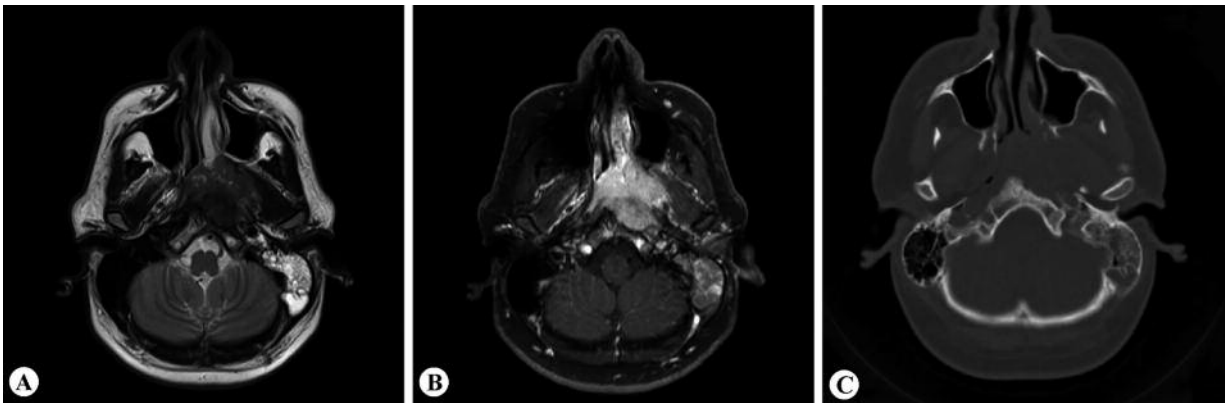

Figure 1. ***A-C,*** Axial T2- weighted MRI, post-gadolinium fat supressed axial T1-weighted MRI and axial CT image demonstrates a large mass lesion filling the nasopharynx, invading the clivus with extension into the left parapharyngeal space and left nasal cavity. Note fluid in the left mastoid air cells.

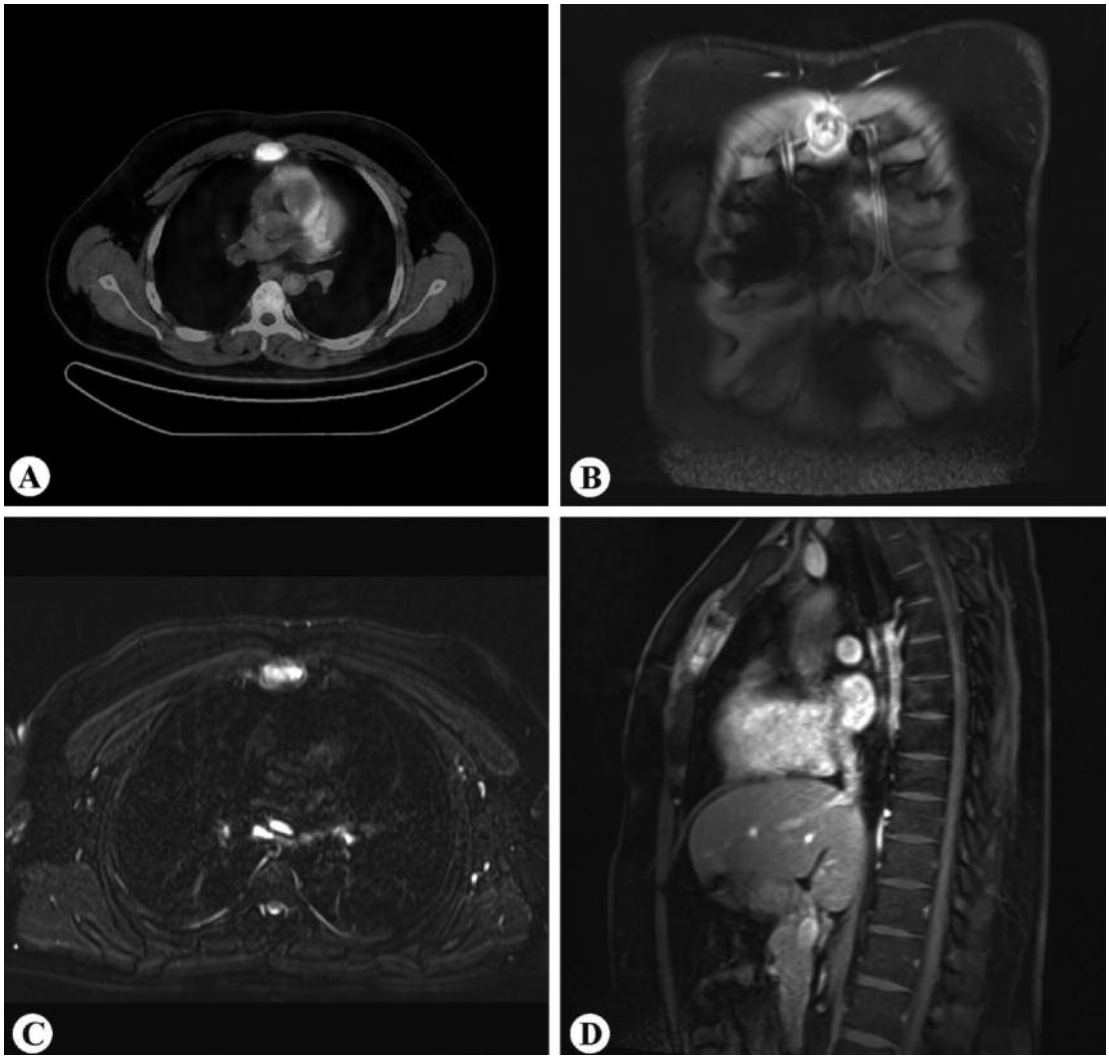

Figure 2. ***A,*** Axial PET CT shows focal increased FDG involvement in the corpus sterni. ***B, D,*** Coronal and sagittal post-gadolinium fat supressed T1-weighted MR images reveal an expansile enhanced lytic mass lesion in the corpus sterni. ***C,*** On axial fat supressed T2- weighted MR images, the lesion depicts high signal intensity.

Imaging is required for the correct staging and treatment planning of nasopharyngeal malignancies. CT and/or MRI are recommended for the diagnostic process and evaluation of tumoral extent at primary site and neck lymph nodes. The limitations of CT scanning are due to its relative lack of sensitivity in detecting skull base erosion, perineural infiltration and early intracranial spread. MRI appears to be better than CT for visualizing soft tissue invasion outside the nasopharynx, for demonstrating involved retropharyngeal nodes and for identifying skull base involvement[7,8].

18F-FDG PET/CT examination recently showed higher sensitivity in detecting distant metastases than conventional work up such as chest X-ray, liver ultrasound and bone scan[9].

Distant dissemination of nasopharyngeal cancer is frequent, with autopsy studies showing 38-87% cases with distant metastases. Major sites of metastatic disease were, in descending order of frequency, the skeleton, the thorax, and the liver[1-3].

At diagnosis, distant metastases are found in about 5 to 7% of NPC patients. Within the first three years following treatment, the overall frequency of metastases is approximately 25%-30%, increasing with advanced stages of disease and in patients with undifferentiated nasopharyngeal tumours[4].

The skeletal system was the most common site of distant metastases. The pattern of skeletal involvement conforms to the general pattern, the spine and pelvis being the common sites. The first region of involvement was lumbar spine (28.4%), then dorsal spine (27.7%), sacrum and pelvis (16.3%), femur (9.9%), rib and sternum (7.8%), humerus (5.0%), cervical spine (3.5%) and skull vault (1.4%). Radiologically, the lesions were lytic in 66.0%, mixed lytic and sclerotic in 12.8% and sclerotic in 21.2%[10].

Metastatic involvement of the sternum by a malignancy may result from direct infiltration from adjacent organs or from hematogenous spread. Cancers of the breast, lung, thyroid, kidney, and colon, and hematologic malignancies such as lymphomas, are among the most common sources of sternal metastases[11]. Most of the cases reported in the literature show it to be from primary breast cancer[12]. This is because breast cancer patients often develop isolated sternal lesions, many of which are caused by local tumor invasion from adjacent parasternal lymph nodes metastasis[13].

The sternum is a difficult area to evaluate radiologically by standard radiographs. However, computed tomography is more sensitive than chest radiography for detecting cortical destruction and expansion. Metastatic involvement of the sternum like metastases elsewhere in the skeleton may be either lytic or blastic. On CT, metastatic sternal lesions may reveal lytic, sclerotic or mixed pattern. Some subtle areas, like sternum, of marrow replacement by malign tissues may be overlooked. MRI often allows more accurate delineation and localization of the tumor. It is helpful in determining the presence and extent of tumor invasion and tissue characterization. Lesions are seen as focal or diffuse areas of hypointensity on T1-weighted images and as areas of intermediate or high signal intensity on T2- weighted images. Tumor deposits usually appear hyperintense against a dark background of suppressed signal intensity within fat on STIR (Short TI Inversion Recovery) images. Metastasis usually enhance strongly. The absence of contrast enhancement practically rules out involvement of the marrow. Contrast enhancement is usually evaluated on T1-weighted images. A pre-injection sequence is mandatory for the evaluation of enhancement. Fat supressed T1-weighted sequences can also be used so that enhancement is more obvious. Sagittal and coronal MRI views may be useful in addition to conventional axial scanning[14].

Early bone metastasis, especially when the majority of tumor cells are confined in the bone marrow, frequently is missed by conventional skeletal scintigraphy (SS). 18F-FDG PET/CT scanning depicts early malignant bone-marrow infiltration because of the early increased glucose metabolism in neoplastic cells. 18F-FDG PET/CT is more sensitive than SS for detecting bone metastasis in endemic NPC at initial staging, whereas SS can be considered as supplementary in this setting[15].

18F-FDG PET/CT is more accurate in detecting bone metastasis in comparison to CT, MRI and bone scintigraphy[16].

Conclusions

Solitary sternal metastasis of nasopharyngeal carcinoma in a patient at the time of diagnosis without any symptoms was detected with 18F-FDG PET/CT evaluation before treatment, and the stage and treatment plan of the patient was changed accordingly.

References

1) Cvitkovic E, Bachouchi M, Boussen H, Busson P, Rousselet G, Mahjoubi R, Flores P, Tursz T, Armand JP, Azli N. Leukemoid reaction, bone marrow invasion, fever of unknown origin, and metastatic pattern in the natural history of advanced undifferentiated carcinoma of nasopharyngeal type: a review of 255 consecutive cases. J Clin Oncol 1993; 11: 2434-2442.
2) Sham JS, Choy D, Choi PH. Nasopharyngeal carcinoma: the significance of neck node involvement in relation to the pattern of distant failure. Br J Radiol 1990; 63: 108-113.
3) Teo PM, Kwan WH, LeeWY, Leung SF, Johnson PJ. Prognosticators determining survival subsequent to distant metastasis from nasopharyngeal carcinoma. Cancer 1996; 77: 2423-2431.
4) Ahmad A, Stefani S. Distant metastases of nasopharyngeal carcinoma: a study of 256 male patients. J Surg Oncol 1986; 33: 194-197.
5) Neel HB. A prospective evaluation of patients with nasopharyngeal carcinoma: an overview. J Otolarygol 1986, 15: 137-144.
6) Sham JS, Wei WI, Lau SK, Yau CC, Choy D. Serous otitis media. An opportunity for early recognition of nasopharyngeal cancer. Arch Otolaryngol Head Neck Surg 1992; 118: 794-797.
7) Chong VF, Fan YF. Skull base erosion in nasopharyngeal carcinoma: detection by CT and MRI. Clin Radiol 1996; 51: 625-631.
8) Olmi P, Fallai C, Colagrande S, Giannardi G. Staging and follow-up of nasopharyngeal carcinoma: magnetic resonance imaging versus computerized tomography. Int J Radiat Oncol Biol Phys 1995; 32: 795-800.
9) Chang JT, Chan SC, Yen TC, Liao CT, Lin CY, Lin KJ, Chen IH, Wang HM, Chang YC, Chen TM, Kang CJ, Ng SH. Nasopharyngeal carcinoma staging by (18)F-fluorodeoxyglucose positron emission tomography. Int J Radiat Oncol Biol Phys 2005; 62: 501-507.
10) Sham JS, Cheung YK, Chan FL, Choy D. Nasopharyngeal carcinoma: pattern of skeletal metastases. Br J Radiol 1990; 63(747): 202-205.
11) Incarbone M, Nava M, Lequaglie C, Ravasi G, Pastorino U. Sternal resection for primary or secondary tumors. J Thorac Cardiovasc Surg 1997; 114: 93-99.
12) Lequaglie C, Massone PB, Giudice G, Conti B. Gold standard for sternectomies and plastic reconstructions after resections for primary or secondary neoplasms. Ann Surg Oncol 2002; 9: 472-479.
13) Kwai AH, Stomper PC, Kaplan WD. Clinical significance of isolated scintigraphic sternal lesions in patients with breast cancer. J Nucl Med 1988; 29: 324-328.
14) O'Sullivan P, O'Dwyer H, Flint J, Munk PL, Muller NL. Malignant chest wall neoplasms of bone and cartilage: a pictorial review of CT and MR findings. Br J Radiol 2007; 80: 678-684.
15) Liu FY, Chang JT, Wang HM, Liao CT, Kang CJ, Ng SH, Chan SC, Yen TC. [^{18}F]fluorodeoxyglucose positron emission tomography is more sensitive than skeletal scintigraphy for detecting bone metastasis in endemic nasopharyngeal carcinoma at initial staging. J Clin Oncol 2006; 24: 599-604. Erratum in: J Clin Oncol 2006; 24: 3515.
16) Qu X, Huang X, Yan W, Wu L, Dai K. A meta-analysis of ^{18}FDG-PET-CT, ^{18}FDG-PET, MRI and bone scintigraphy for diagnosis of bone metastases in patients with lung cancer. Eur J Radiol 2012; 81: 1007-1015.